

atzteile Originale oder
reservedel Originale
ginal spare parts Pa
ali Original reserve
Originale oder de
ginals Alkoperäine
atzteile Originale oder
reservedel Originale
ginal spare parts Pa
ali Original reserve
atzteile Originale oder
entes originals Alku
Ho Originale oder
ginal spare parts Pa

SMD Capacitor kit

An introduction to SMD technology

The development of SMDs

During the early 1970s miniaturization was considered more important than cost, and engineers had little choice but to use SMDs. Between 1975 and 1980 miniaturization continued, with SMDs providing more functions in the limited available space. During this period, surface mount equipment developed rapidly. Since 1980 there has been a spectacular growth in surface mount assembly and is still the case today.

SMD technology is the most significant revolution in the electronics industry since the advent of the integrated circuit. Within a decade, this emerging technology has established itself as tomorrow's technology today. It is highly automated, and has set new standards for quality and reliability. In 1984 world consumption of electronic devices was around 190 billion, of which some 50 billion were surface mounted. By 1995 approximately 70 percent of all components will be surface mounted.

Surface mounted devices (SMDs) are at the heart of this technology. Conventional PCBs use components that are connected by pins or wires, which normally pass through the board and are soldered on the underside only. SMDs are high performance, miniaturized components, attached to a substrate by soldering directly onto solder lands. Both leadless and leaded SMDs are produced, including an enormous variety of integrated circuits, discrete semiconductors, and passive components. Hundreds of thousands of different components are now available in surface mount form, offering an attractive alternative to many of the conventional through-hole components.

Surface Mounted Device Kits

Now, there's a strong and reliable means of storing all your SMD components quickly and efficiently. The compact and lightweight Philips SMD kits.

Philips SMD kits give you portable and sturdy boxes, containing 10 pieces each of a carefully selected range of SMD components. All you have to do is arrange the boxes into the shape that suits you best.

No need for fingers, you simply select the component you need using the complimentary tweezers. Simple, fast and convenient.

In fact, these versatile kits are the first permanent but highly portable home for all SMDs. The SMD kits take the knocks of everyday use and thanks to the snap-shut lids make wastage a thing of the past. What's more, it'll easily fit into a tool kit, or onto a shelf in your workshop. For quick identification all the boxes are labelled with colour coding and description.

SMD kits are extendable !! You simply add new boxes as and when required, so you can tailor the kits exactly to your own needs.

SMD kits are supplied with cross reference guides to make re-ordering easy. Empty boxes with blank labels are also available to enable you to compliment our selection of components with components of your own choice.

Convenient

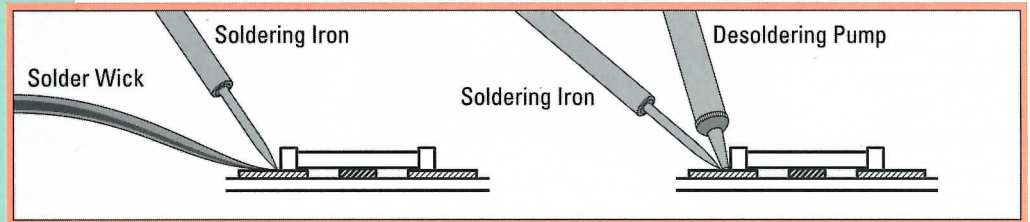
Contents

page 2	Introduction
page 3	Surface Mounted Device Kits
page 4	Removal methods
page 5	Replacement method
page 6	SMD kit contents
page 7	Repair tools for SMD
page 8	Worldwide Service Organisations

Removal methods for SMD components

Method 1

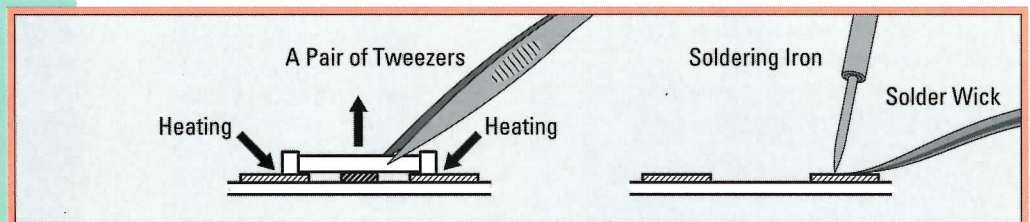
fig.1 Removal of components with soldering iron and desoldering pump.



- Small components such as resistors, capacitors, electrolytic capacitors and semiconductors (glued or not) are removed using a little horizontal force while removing solder with braid. Good results can also be obtained with a desoldering pump. The solder pads have to be free from excess solder, so that printed circuit board is ready for mounting new components.
- IC packages can be removed by taking away excess solder with braid. The component can then be removed by turning it with a pair of tweezers. A little vertical force on the board is recommended. Excess solder can be removed with braid and a soldering iron. Braid (also called wick) is stranded copper wire or braiding impregnated with flux.

Method 2

fig.2 Removal of components with soldering iron and tweezers.



- Small components such as resistors, capacitors and small electrolytic capacitors are removed by heating one of the electrodes with a small soldering iron for 2 to 3 s to melt the solder, whilst holding the component body with tweezers. Then, the other electrode is quickly heated with the same soldering iron. Now, the component can be removed with the tweezers while solder on both electrodes is molten.
- Small semiconductors such as SOT-23 are removed by heating the two leads on one side together for 2 to 3 s whilst holding the component with tweezers. Then the other lead is quickly heated and the component removed (see note).

Desoldering Pump 4822 395 10159

Soldering Station 4822 395 10163

Soldering Station Bits:

0.4 mm 4822 395 10168

0.8 mm 4822 395 10166

1.6 mm 4822 395 10169

Solder Wick 1.5 mm 4822 321 40041

A Pair of Tweezers (supplied in SMD kit)

Solder:

ø 0.6 mm 4822 390 80134

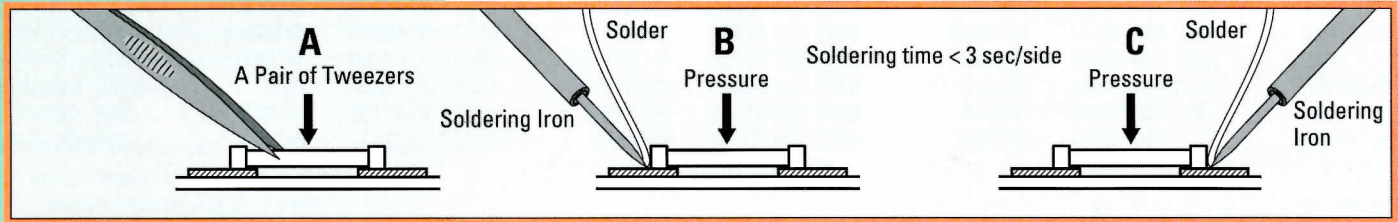
ø 0.8 mm 4822 390 80133

Notes for methods 1 and 2:

- The surface of the printed circuit board is easily damaged by the soldering iron tip. Therefore the soldering iron should be held horizontally when the solder is removed with braid or when the iron is used to heat the soldered joints before removing the component.
- Use a soldering iron with a small tip. The maximum temperature of the tip must be 350 °C, so that the soldering is performed at a temperature no greater than 225 to 250 °C. The soldering time should be 2 to 3 s.

Replacement method

fig.3 Replacement of small components with a soldering iron.
(A illustrates placing, B+C shows soldering).



a) Components with few connection leads. The small solder tip for small components must be placed on the solder pad, not on the lead of the component. Thin ($\varnothing 0.5 - 0.8 \text{ mm}$) solder wire is used, solder alloy tin 60 lead 40 with a mildly activated resin flux, maximum soldering time 3 s. It is not advised to glue the body of the component for a temporary attachment; Temporary attachment can be achieved by a very short heating of the already pre-soldered pads, to prevent the SMDs from shifting.

b) Components with many connection leads. These components are soldered by placing the component on the solder pads with a pair of tweezers and reflowing the solder at the edges of two pads on opposite diagonals. The component is now held in place. Soldering is then completed as usual with solder wire, as detailed in point a) above.

SMD Semiconductor Cross Reference Guide: SMD/Conventional

SMD	Conventional	SMD	Conventional	SMD	Conventional	SMD	Conventional	SMD	Conventional	SMD	Conventional	SMD	Conventional	SMD TYPE in SOT-223
BA682	BA482	BC818-16	BC338-16	BCF32	BC549 B	BCX51*	BC636	BF841	BF241	BSD20		BST60*	BSR60	BF720
BA683	BA483	BC818-25	BC338-25	BCF33	BC549 C	BCX52*	BC638			BSD22		BST61*	BSR61	BF721
		BC818-40	BC338-40			BCX53*	BC640	BF989	BF960			BST62*	BSR62	BF722
BAS16	BAW62			BCF70	BC560 B	BCX54*	BC635	BF990	BF980	BSR12	2N2894 A			BF723
BAS17	BA314	BC846 A	BC546 A	BCF81	BC550 C	BCX55*	BC637	BF991	BF981	BSR13	2N2222	BST80	BST70 A	
BAS19	BAV19	BC846 B	BC546 B			BCX56*	BC639	BF992	BF982	BSR14	2N2222 A	BST82	BST72 A	BFG35
BAS20	BAV20			BCV26	BC516			BF994	BF984	BSR15	2N2907	BST84	BST74 A	
BAS21	BAV21	BC847 A	BC547 A	BCV27	BC517	BCX68*	BC368	BF994 S	BF984 S	BSR16	2N2907 A	BST86	BST76 A	BFG97
BAS28	BAW62 2x	BC847 B	BC547 B			BCX69*	BC369	BF996	BF986					
BAS29	BAX12 A	BC847 C	BC547 C	BCV61	BC547 2x			BF996 S	BF986 S	BSR17	2N3903	BST120		BCP51
BAS31	BAX12 A 2x			BCV62	BC557 2x	BCX70 G	BC547 A	BF997		BSR17 A	2N3904	BST122		BCP52
BAS32	BAW62	BC848 A	BC548 A	BCV63	BC547 2x	BCX70 H	BC547 B		BFG67	BSR18	2N3905			BCP53
BAS35	BAX12 A 2x	BC848 B	BC548 B	BCV64	BC557 2x	BCX70 J	BC547 B	BFG67	BFG65	BSR18 A	2N3906	BSV52	BSX20	BCP54
BAS56	BAV10	BC848 C	BC548 C	BCV65	BC547/557	BCX70 K	BC547 C	BFG92 A	BFR90 A	BSR19	2N5550	BYD17	BYD13	BCP55
								BFG93 A	BFR91 A	BSR19 A	2N5551	BYD37	BYD33	BCP56
BAT17	BA481	BC849 B	BC549 B	BCV71	BC546 A	BCX71 G	BC557 A	BFQ17	BFW16 A	BSR20	2N5400	BYD77	BYD73	BCP68
BAT18	BA482	BC849 C	BC549 C	BCV72	BC546 B	BCX71 H	BC557 B	BFQ18 A*	BFQ34	BSR20 A	2N5401			BCP69
						BCX71 J	BC557 B	BFQ19*	BFQ96					
BAV70	BAW62 2x	BC850 B	BC550 B	BCW29	BC558 A	BCX71 K	BC557 C	BFQ67	BFQ65	BSR30*	2N4030	BZD27/C..	BZD23/C..	
BAV99	BAW62 2x	BC850 C	BC550 C	BCW30	BC558 B					BSR31*	2N4031			BSP15
BAV100	BAV18			BCW31	BC548 A	BF510	BF410 A			BSR32*	2N4032	BZV49*	BZV85	BSP16
BAV101	BAV19	BC856 A	BC556 A	BCW32	BC548 B	BF511	BF410 B	BFR30	BFW11	BSR33*	2N4033	BZV55		BSP19
BAV102	BAV20	BC856 B	BC556 B	BCW33	BC548 C	BF512	BF410 C	BFR31	BFW12					BSP20
BAV103	BAV21					BF513	BF410 D	BFR93	BFW93	BSR40*	BSX46-10	BZX84	BZX79	
		BC857 A	BC557 A	BCW60 A	BC548 A			BFR92	BFR90	BSR41*	BSX46-16			
BAW56	BAW62 2x	BC857 B	BC557 B	BCW60 B	BC548 B	BF536	BF936	BFR92 A	BFR90	BSR42*	2N3020	PMBT2222/AMPS2222/A		BSP30
		BC857 C	BC557 C	BCW60 C	BC548 B	BF550	BF450	BFR93	BFR91	BSR43*	2N3019	PMBT2907/AMPS2907/A		BSP31
BB215	BB405 B			BCW60 D	BC548 C	BF569	BF970	BFR93 A	BFR91					BSP32
BB219	BB909	BC858 A	BC558 A			BF579	BF979	BFR93 A	BFR91	BSR56	2N4856	PMBTA05	MPSA05	BSP33
		BC858 B	BC558 B	BCW61 A	BC558 A					BSR57	2N4857	PMBTA06	MPSA06	
BBY-31	BB405 G	BC858 C	BC558 C	BCW61 B	BC558 B	BF620*	BF420			BSR58	2N4858			BSP40
BBY-39				BCW61 C	BC558 B	BF621*	BF421	BFR101 A				PMBTA13	MPSA13	BSP41
BBY-40	BB809	BC859 A	BC559 A	BCW61 D	BC558 C	BF622*	BF422	BFR101 B				PMBTA14	MPSA14	BSP42
		BC859 B	BC559 B			BF623*	BF423			BSS63	BSS68			BSP43
		BC859 C	BC559 C					BFS17	BFW92	BSS64	BSS38	PMBTA42	MPSA42	
BC807-16	BC327-16			BCW69	BC557 A	BF660	BF606 A	BFS17 A	BFW92 A	BSS83		PMBTA43	MPSA43	BSP50
BC807-25	BC327-25			BCW70	BC557 B	BF67	BF967	BFS19	BF494					BSP51
BC807-40	BC327-40	BC860 A	BC560 A	BCW71	BC547 A			BFS20	BF199	BST15*	2N5415	PMBTA63	MPSA63	BSP52
		BC860 B	BC560 B	BCW72	BC547 B					BST16*	2N5416	PMBTA64	MPSA64	
BC808-16	BC328-16	BC860 C	BC560 C	BCW81	BC547 C	BF820	BF420	BFT25	BFT24					
BC808-25	BC328-25			BCW82	BC547 B	BF821	BF421	BFT46	BFW13	BST39*		PMBTA92	MPSA92	BSP60
BC808-40	BC328-40	BC866*	BC368	BCW83	BC556 A	BF822	BF422	BFT92	BFQ51	BST40*		PMBTA93	MPSA93	BSP61
		BC869*	BC369			BF823	BF423	BFT93	BFQ23					BSP62
BC817-16	BC337-16			BCX17	BC327					BST50*	BSR50			
BC817-25	BC337-25	BCF29	BC559 A	BCX18	BC328	BF824	BF324			BST51*	BSR51	PXTA14	MPSA14	BZV..
BC817-40	BC337-40	BCF30	BC559 B	BCX19	BC337			BRY61	BRY56	BST52*	BSR52	PXTA93	MPSA93	
				BCX20	BC338	BF840	BF240	BRY62	BRY39					

* Conventional type of SOT-223

SMD Semiconductor kit / SBC 7091

Service code 4822 310 31882

TYPE	SERVICE CODE	TYPE	SERVICE CODE	TYPE	SERVICE CODE	TYPE	SERVICE CODE
BAV99	5322 130 34337	BC847C	5322 130 42755	BC817-25	4822 130 42804	BC848	4822 130 61207
BAV103	4822 130 80877	BC858B	5322 130 41983	BC818	4822 130 42675	BC858A	5322 130 42012
BAW56	5322 130 30691	BC857C	5322 130 42756	BC818-16	4822 130 60071	BC847	4822 130 42705
BAS16	5322 130 31928	BC807-25	5322 130 60845	BC818-25	4822 130 42696	BC817	4822 130 42133
BAS32L	4822 130 80446	BC868	5322 130 61569	BC848C	5322 130 42135	BC858	4822 130 62748
BC848B	5322 130 41982	BC869C	4822 130 60142	BC858C	4822 130 42513	BC857	4822 130 61233

SMD Resistor kit / SBC 7092

Service code 4822 310 31881

TYPE	SERVICE CODE	TYPE	SERVICE CODE	TYPE	SERVICE CODE	TYPE	SERVICE CODE
0Ω	4822 051 10008	56Ω	4822 051 40569	3K9Ω	4822 051 40392	270KΩ	4822 051 40274
1Ω0	4822 051 10108	68Ω	4822 051 40689	4K7Ω	4822 051 40472	330KΩ	4822 051 40334
1Ω2	4822 051 10128	82Ω	4822 051 40829	5K6Ω	4822 051 40562	390KΩ	4822 051 40394
1Ω5	4822 051 10158	100Ω	4822 051 40101	6K8Ω	4822 051 40682	470KΩ	4822 051 40474
1Ω8	4822 051 10188	120Ω	4822 051 40121	8K2Ω	4822 051 40822	560KΩ	4822 051 40564
2Ω2	4822 051 10228	150Ω	4822 051 40151	10KΩ	4822 051 40103	680KΩ	4822 051 40684
2Ω7	4822 051 10278	180Ω	4822 051 40181	12KΩ	4822 051 40123	820KΩ	4822 051 40824
3Ω3	4822 051 10338	220Ω	4822 051 40221	15KΩ	4822 051 40153	1M0Ω	4822 051 10105
3Ω9	4822 051 10398	270Ω	4822 051 40271	18KΩ	4822 051 40183	1M2Ω	4822 051 10125
4Ω7	4822 051 10478	330Ω	4822 051 40331	22KΩ	4822 051 40223	1M5Ω	4822 051 10155
5Ω6	4822 051 10568	390Ω	4822 051 40391	27KΩ	4822 051 40273	1M8Ω	4822 051 10185
6Ω8	4822 051 10688	470Ω	4822 051 40471	33KΩ	4822 051 40333	2M2Ω	4822 051 10225
8Ω2	4822 051 10828	560Ω	4822 051 40561	39KΩ	4822 051 40393	2M7Ω	4822 051 10275
10Ω	4822 051 40109	680Ω	4822 051 40681	47KΩ	4822 051 40473	3M3Ω	4822 051 10335
12Ω	4822 051 40129	820Ω	4822 051 40821	56KΩ	4822 051 40563	3M9Ω	4822 051 10395
15Ω	4822 051 40159	1K0Ω	4822 051 40102	68KΩ	4822 051 40683	4M7Ω	4822 051 10475
18Ω	4822 051 40189	1K2Ω	4822 051 40122	82KΩ	4822 051 40823	5M6Ω	4822 051 10565
22Ω	4822 051 40229	1K5Ω	4822 051 40152	100KΩ	4822 051 40104	6M8Ω	4822 051 10685
27Ω	4822 051 40279	1K8Ω	4822 051 40182	120KΩ	4822 051 40124	8M2Ω	4822 051 10825
33Ω	4822 051 40339	2K2Ω	4822 051 40222	150KΩ	4822 051 40154	10MΩ	4822 051 10106
39Ω	4822 051 40399	2K7Ω	4822 051 40272	180KΩ	4822 051 40184		
47Ω	4822 051 40479	3K3Ω	4822 051 40332	220KΩ	4822 051 40224		

SMD Capacitor kit: size 1206 / SBC 7093

Service code 4822 310 31915

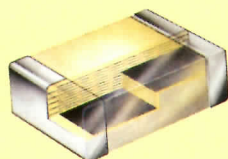
TYPE NPO	SERVICE CODE	TYPE NPO	SERVICE CODE	TYPE X7R	SERVICE CODE	TYPE X7R	SERVICE CODE
0.47	5322 126 10514	39	4822 122 31972	680	4822 122 32535	56000	4822 122 32183
0.56	4822 126 11295	47	4822 122 31772	820	4822 122 31974	68000	4822 122 32891
0.68	4822 126 11548	56	4822 122 31774	1000	5322 122 31647	82000	5322 122 32838
0.82	4822 126 11147	68	4822 122 31961	1200	4822 122 32808	100000	4822 122 33496
1.0	4822 122 32479	82	4822 122 31839	1500	4822 122 31781		
1.2	4822 122 33013	100	4822 122 31765	1800	4822 122 32153		
1.5	4822 122 31792	120	4822 122 31766	2200	4822 122 31644		
1.8	4822 122 32087	150	4822 122 31767	2700	4822 122 33498		
2.2	4822 122 32425	180	4822 122 31768	3300	5322 122 33446		
2.7	4822 122 32505	220	4822 122 31965	3900	4822 122 32566		
3.3	4822 122 32079	270	4822 122 32142	4700	4822 122 31784		
3.9	4822 122 32081	330	5322 122 31842	5600	4822 122 31916		
4.7	4822 122 32082	390	4822 122 31771	6800	4822 122 32597		
5.6	4822 122 32506	470	4822 122 31727	8200	4822 122 32856		
6.8	4822 122 32507	560	4822 122 31773	10000	4822 122 32442		
8.2	4822 122 32083	680	4822 122 31775	12000	5322 122 31648		
10	4822 122 31971	820	4822 122 32765	15000	4822 122 31782		
12	4822 122 32139	1000	4822 122 31746	18000	4822 122 31759		
15	4822 122 32504	1200	4822 122 31807	22000	4822 122 31797		
18	4822 122 31769	1500	5322 126 10328	27000	4822 122 32541		
22	4822 122 32482	1800	4822 122 33481	33000	4822 122 31981		
27	4822 122 31825	2200	5322 122 33816	39000	4822 122 33608		
33	4822 126 10324			47000	4822 122 32542		

TYPE Y5V	SERVICE CODE
10000	4822 126 11542
15000	4822 126 11543
22000	4822 126 11544
33000	4822 126 11545
47000	5322 122 31862
68000	4822 126 11569
100000	4822 122 31947

Also available loose chip containers 5 pieces, including blank labels 4822 418 60064



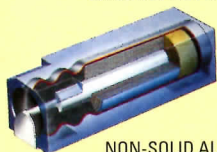
THICK-FILM RESISTOR



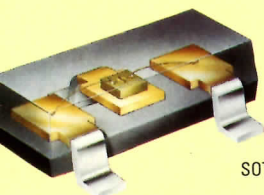
CERAMIC MULTILAYER CAPACITOR



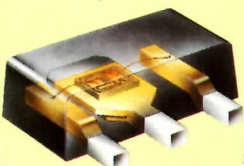
SOLID ALUMINIUM
ELECTROLYTIC CAPACITOR



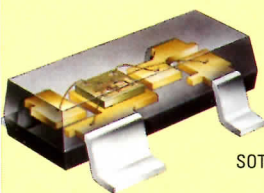
NON-SOLID ALUMINIUM
ELECTROLYTIC CAPACITOR



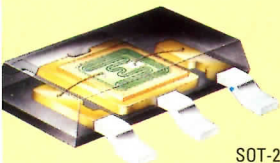
SOT-23



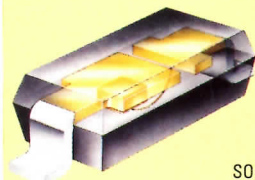
SOT-89



SOT-143



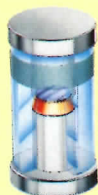
SOT-223



SOD-123



SOD-87



SOD-80

Recommended repair tools for SMD

Philips soldering station SBC 345

Electronic temperature control.
Temperature adjustable 100 - 470 °C.
Tip temperature read-out. ESD protection.
Service code 4822 395 10163.

Philips replacement solder station tips

1/64" (0.4 mm) Round
Service code 4822 395 10168
1/32" (0.8 mm) Flat
Service code 4822 395 10167
1/32" (0.8 mm) Round
Service code 4822 395 10166
1/16" (1.6 mm) Round
Service code 4822 395 10169

Philips flux cored solder SBC 341 / SBC 342

60 tin 40 lead alloy.
0.6 mm, 100 gr. Service code 4822 390 80134
0.8 mm, 100 gr. Service code 4822 390 80133

Philips desoldering pump SBC 321

Strong suction. Replaceable teflon tip.
Lightweight nylon glass construction.
Service code 4822 395 10159.

Philips desolder braid (wick) SBC 305

Copper braid. Length 1.5 m. Width 1.5 mm.
Service code 4822 321 40041.

Philips PCB repair set SBC 324

Service code 4822 395 90575

